QUIZ 4 (take home, due Monday 4/5/10) Physics 3313 Chapter 6
Name:

1) Which statement is FALSE? The wave function $\Psi$
   a) must be continuous and single-valued.
   b) must have continuous derivatives.
   c) must be normalizable.
   d) must be a real function.

2) Which statement is FALSE?
   a) A particle with energy higher than the potential in a finite potential well is a free particle.
   b) A particle can escape from an infinite potential well.
   c) A particle with energy less than the potential of a finite barrier can pass through that barrier and appear on the other side.
   e) Quantum Mechanics can be used to address harmonic oscillator problems.

3) Which of the following is FALSE
   a) Wave functions that are solutions of Schrodinger’s equation are known as Eigenfunctions.
   b) Quantization of energy results from Schrodinger’s equations
   c) Every form of the potential in Schrodinger’s equation gives the same solution
   d) Two solutions of Schrodinger’s equation can have the same energy

4. In quantum mechanics there is a process by which an electron can start in a region of relatively weak forces, enter a classically forbidden region, and then reemerge on the other side of that region. The electron, it can be said, travels through a “wall.” How do scientists commonly refer to this process?
   - Boring
   - Bremsstrahlung
   - Spontaneous fission
   - Correspondence
   - Tunneling
5. Both the classical and quantum mechanical probability densities predict for a simple harmonic oscillator that
- the probability of the particle being at that location will be greatest at regions of greatest potential energy.
- the particle has a finite probability of being in a region with $V > E$, where $E$ is the total energy of the system.
- at very large values of $n$ (the number of energy state), the particle will most likely be detected furthest from the equilibrium position within its classically defined range of motion
- the minimum energy of the oscillating particle is zero